

## REMARKS

Claims 1, 14, 25, 33 and 43 have been amended. Claims 1 to 48 remain pending in this patent application. Applicants now address each and every point raised by the Examiner in the above-identified Office action as follows:

### I. Telephone Interview

Applicants acknowledge with appreciation the time that the Examiner took to conduct an unscheduled telephone interview with its patent attorney on August 27, 2003, to discuss the office action, cited prior art, and state of the pending claims. During the telephone conference, the Fang patent was discussed and, more specifically, the particular three-phase material construction consisting of a number of particles (each comprising a two-phase arrangement of a hard phase and first binder phase, e.g., cemented tungsten carbide) that are disposed within a further second binder phase (which Fang discloses can comprise a low CTE alloy) was examined in detail. Applicants' claimed composition was distinguished as comprising only a two-phase material construction comprising a hard phase (e.g., WC) and a binder phase (formed from a low CTE alloy selected from a group of materials) having a quantified CTE performance property.

A key structural difference between the two constructions is that Applicants' material construction is essentially the first two phases of the Fang patent, and it does not include Fang's further second binder phase. Additionally, it was discussed that Fang only discloses the concept of using a low CTE material as the second binder phase surrounding the particle formed from the hard and first binder phase, and does not disclose the concept of using a low CTE material as the first binder phase (which is essentially the binder phase recited in Applicants' claims that is formed from the low CTE binder alloy).

In view of this discussion and understanding, Applicants were invited to prepare a response addressing and clarifying these points in the context of the pending claim rejections.

II. Rejection of Claims Under Section 103

Claims 1 to 48 have been rejected under 35 U.S.C. §103 as being allegedly unpatentable over Fang et al. As noted briefly above, Applicants' claimed invention is a two-phase material comprising a first phase of grains (e.g., WC) that are bonded together with a second phase of binder alloy. The binder alloy used to bond the grains together is one formed from a blend of different materials that are specifically selected to provide a coefficient of thermal expansion (CTE) that closely matches that of the first phase of grains. The claims further quantify the thermal expansion parameter as being one that is less than about 10 ppm/ $^{\circ}$ C within a temperature range of from 100 to 700 $^{\circ}$ C.

A first point of departure from Fang is that the material construction of Fang involves a three-phase arrangement of different material phases, where Applicants' claimed composition involves only a two-phase material arrangement. The Fang construction involves first the formation of a particle having two material phases (e.g., a hard phase and a binder phase), and then the placement of the particle in a further second binder phase. Fang discloses that this second binder phase (i.e., not the first binder phase used to bond the hard grains to form the particles) can be formed from a low CTE alloy material. Again, it is important to note that this second binder phase is not even present in Applicants' claimed composition.

The use of a low CTE alloy material in Fang is directed to improving the thermal expansion compatibility between the particles (e.g., formed from cemented tungsten carbide) and the continuous matrix binder phase surrounding the same. Contrast this with Applicants' claimed material composition where the low CTE binder alloy is used to bond together the hard phase grains themselves (e.g., the two material phases used to form the particles in Fang). Applicants' invention is structurally distinguishable from Fang because it was developed to address an issue that is different than that of Fang; namely, improving the thermal expansion compatibility between the hard phase grains and the binder phase bonding the same together. Again, while Fang deals with the particles and a surrounding matrix, Applicants' invention deals with the hard phase grains and binder that are combined together to form the particles.

With this background in mind, the Examiner notes in rejecting the claims that Fang discloses a cermet material comprising "a WC hard phase; and a binder phase of Fe-Ni-Co alloys." While Fang does disclose particles comprising a WC hard phase and a binder phase bonding the hard phase grains together, the passage in Fang relied upon by the Examiner relating to the binder phase alloy is one that is descriptive of the second binder phase that is used to surround the particles (formed from the WC grains and first binder) together. The Examiner further notes that Fang discloses that the binder phase have a low CTE. Again, this is true with respect to the second binder phase in Fang that is used to surround the particles. However, Fang does not disclose or suggest that the binder phase used to form the particles have a low CTE.

Fang does disclose that the first binder can be formed from Co, Ni, Fe, alloys thereof, and alloys with materials selected from the group consisting of C, B, Cr, Si and Mn. However, Fang fails to disclose or suggest that the first binder have low CTE properties, and does not provide any motivation or suggestion to one having ordinary skill in the art on how to possibly combine or select these different materials to obtain low CTE properties. Much less, one having a very specific CTE of less than about 10 ppm/°C within a temperature range of from 100 to 700°C as claimed.

Again, however, this is not surprising given the fact that Fang is concerned about obtaining thermal expansion compatibility between the particles and the surrounding second binder phase, not about obtaining thermal expansion compatibility between the hard grains and the first binder used to form the particles themselves.

For these reasons, Applicants submit that one having ordinary skill in the art would not be motivated by Fang to use the CTE binder alloy, disclosed for surrounding the particles, to replace the binder used to bond together the hard grains to form the particles. Thus, Applicants submit that its invention as recited in independent claims 1, 14, 25, 33, and 43, and the remaining claims depending therefrom are not obvious, under 35 U.S.C. §103, and respectfully request that the rejection of these claims be reconsidered and withdrawn.

III. Objection to the Disclosure

The disclosure, for example at page 13, lines 33, has been objected to because of an alleged improper reference to a figure. Applicants submit that this matter was attended to by amending this passage of the description in its earlier response filed on April 2, 2003. In view thereof, Applicants respectfully request that the objection to the disclosure on this basis be reconsidered and withdrawn.

IV. Conclusion

For the reasons presented above, Applicants respectfully request that the rejection of claims under 35 U.S.C. §103, and the objection to the disclosure, each be reconsidered and withdrawn, and that claims 1 to 48 pending in this application be passed to allowance.

The Commissioner is hereby authorized to charge any additional fees to Deposit Account 10-0440, or to credit any overpayment to the same. A duplicate copy of this paper is enclosed.

Respectfully submitted,



GRANT T. LANGTON  
Reg. No. 39,739

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GTL/ke

JEFFER MANGELS BUTLER & MARMARO LLP  
SEVENTH FLOOR  
1900 AVENUE OF THE STARS  
LOS ANGELES, CALIFORNIA 90067-4008  
TELEPHONE: (310) 203-8080  
FACSIMILE: (310) 203-0567

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